

**Notice of Allowability**

Application No.

10/780,670

Examiner

David Nhu

Applicant(s)

KAZUMI ET AL.

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 2/19/04.
2. ☒ The allowed claim(s) is/are 1-13.
3. ☒ The drawings filed on 19 February 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 01
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.



### REASONS FOR ALLOWANCE

1. Claims 1-13 are allowed.
2. The following is an examiner's statement of reasons for allowance: None of the references of record teaches or suggests as cited in claims 1, 3, 11, 12: An LSI device etching method for subjecting an LSI device to a plasma etching, the LSI device including copper (Cu) interconnection and a low-k film, the LSI device being provided with a diffusion prevention film containing silicon (Si) for preventing diffusion of Cu into the low-k film, the LSI device etching method comprising selectively etching the diffusion prevention film against the low-k film, by use of a gas containing sulfur (S) as an etching gas (as cited in claim 1); An LSI device etching method for subjecting an LSI device to a plasma etching, the LSI device including a silicon (Si) containing mask material and any of an underlying low-k film and a resist, the LSI device etching method comprising selectively etching the mask material against any of the underlying low-k film and the resist, by use of a gas containing sulfur (S) as an etching gas (as cited in claim 3); An LSI device etching method for subjecting an LSI device to a plasma etching, the LSI device having a damascene structure including copper (Cu) interconnection, a SiCO low-k film and a SiC diffusion prevention film, the LSI device etching method comprising selectively etching the diffusion prevention film against the low-k film, by use of a mixture of SO<sub>2</sub> and NF<sub>3</sub> as an etching gas (as cited in claim 11); An LSI device etching apparatus etching an LSI device to a plasma etching, the LSI device having a damascene structure including Cu interconnection, a low-k film and a diffusion prevention film, said LSI device etching apparatus comprising: a plasma treatment apparatus which changes an etching gas into plasma and applies high frequency power to an electrode to thereby etch the LSI device

by utilizing ions in the plasma said plasma treatment apparatus having a treatment chamber being provided with a support table in which said electrode is provided and on which the LSI device is to be placed, the etching gas being introduced into said treatment chamber, wherein a mixture of a sulfur (S) containing gas and a nitrogen (N) and fluorine(F) containing gas is used as the etching gas in the step of selectively etching the diffusion prevention film against the low-k film ( as cited in claim 12).

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

#### **CONCLUSION**

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Nishizawa (6,617,244 B2): Etching Method.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM.

The examiner's supervisor, David Nelms can be reached on (571)272-1787.

*The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.*

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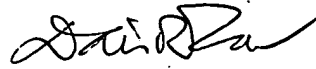
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*Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.*

David Nhu



March 4, 2005



DAVID  
PRIMAR